Biochar – A Cool new tool for afforestation practices in Cool Forests.

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Background:

- The most important tool for afforestation in conifer-dominated forests of Northern Europe is planting.

- Since 1960's the containerized planting stock is mainly used. Raw peat is used as growing media.

Problems:

- Environmental issues:

  Although there is no doubt that afforestation is environmental friendly activity, possible new and more beneficial approaches should be searched.

  Considerable negative effect on the environment is done by the extraction of peat from the ground.

  The production of mineral fertilizers is environmentally harmful activity.

  Climate change, GHG emissions and C dynamics issues are important, and forestry section must also take into account these questions.

- Economical issues:

  Survival issues of seedlings cause the loss of investments done on planting material and labor, as about 20% of seedlings die during the first couple of growing seasons.

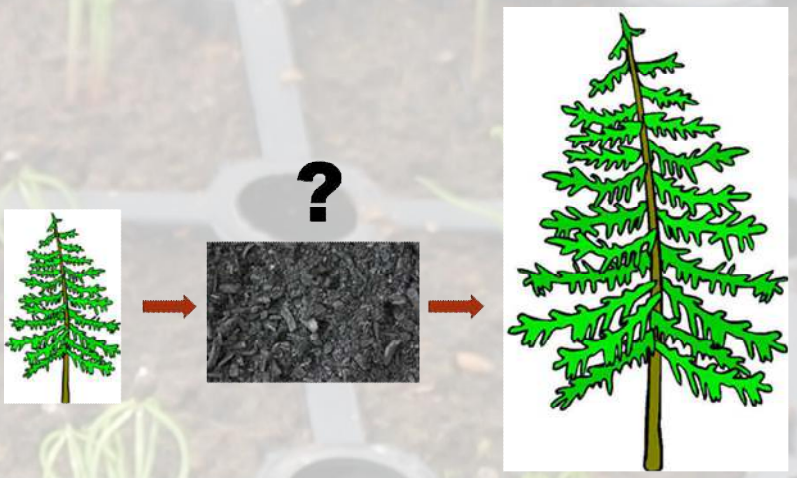
The main outcome of the project is **to develop novel substrates to grow forest tree seedlings.** We propose to replace part of the peat by **biochar**.

Our aim was to:

- …estimate the impact of added biochar to the properties of the growing media.

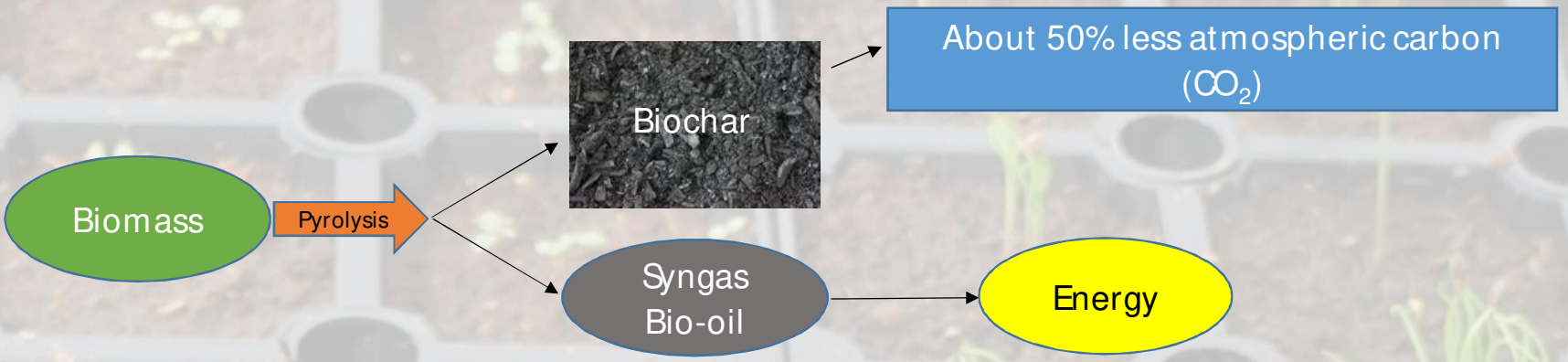
- …estimate the impact of added biochar to the growth of tree seedlings.

For that we compared the effect of different proportions of added biochar to the growing media



Biochar:

- Biochar is the product of pyrolysis (burning under low oxygen conditions) of biomass.



- Biochar has been used as soil amendment in the field of agriculture (maize, tomatoes and soya have shown increased growth of roots, and improved well-being and survival of the plants.

- The commercial application of biochar in the afforestation practices has been modest = missing.

Study design:

- Studied species: *Pinus sylvestris*, *Picea abies* and *Betula pendula*.
- Growing media: peat-based (including starter-fertilizer).
- Treatments: 0%, 5%, 10% and 20% of biochar added to the growing media (volume).
- Sub-treatment with fertilizers: 0%, 50% and 100% fertilizing during the growing period.

Measurements:

- Soil moisture content.
- Soil nutrient content and soil pH.
- Germination rate and growth of seedlings.
- Measurements of plants at the end of the first growing season.

Benefits of new approach:

- The proposed technology would partially replace peat in content of the growing media. Possible improvements related to this change are:

  By adding biochar to the growing media it is possible to remove some of the carbon from the system for many years, and this in turn has positive effect on climate change.

  The use of biochar is more environmental friendly compared to peat

  Reduced use of mineral fertilizers in the field of forestry.

  Increased survival of the seedlings due to the improved belowground growth.

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Thank you for listening!